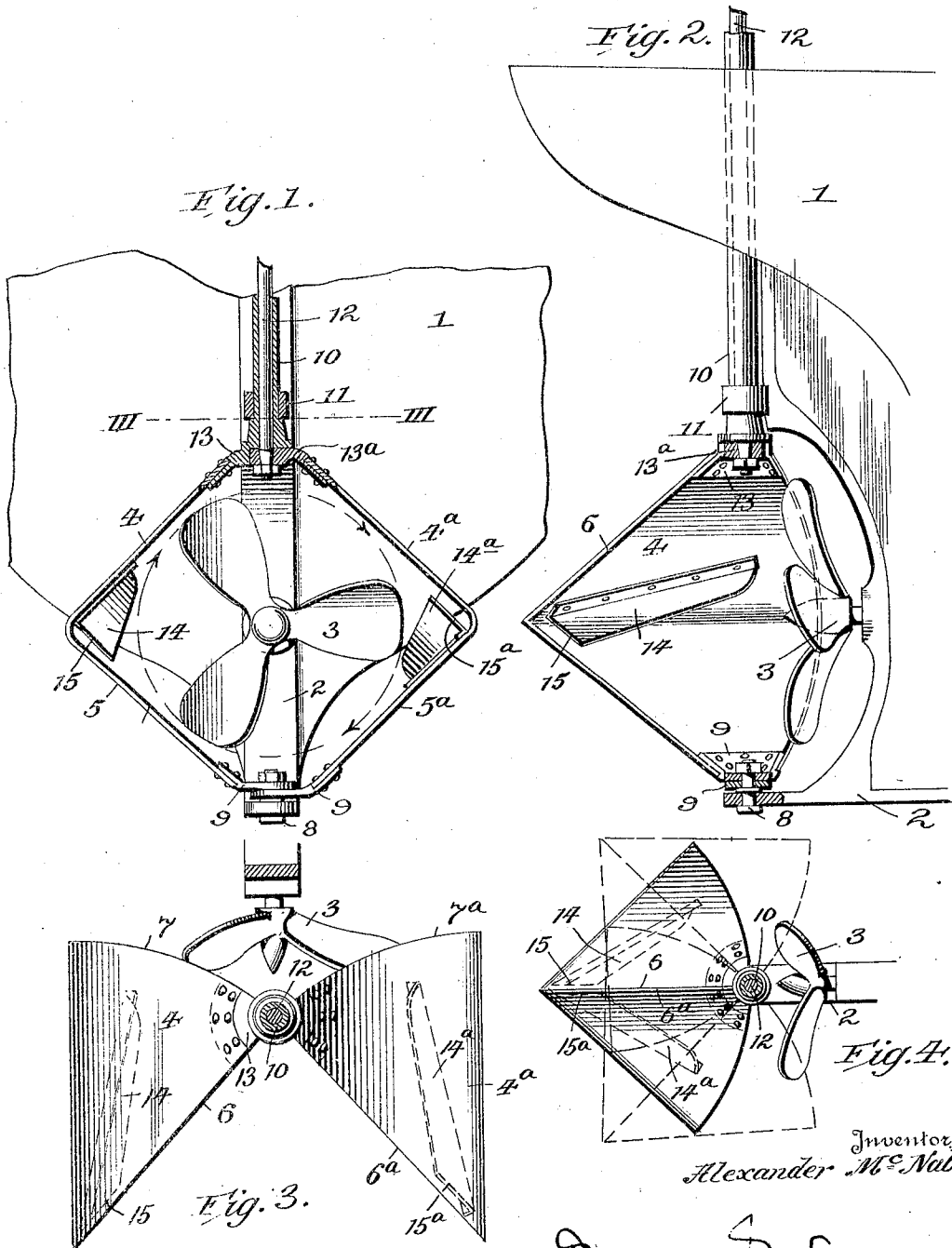


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 RUDDER.
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1,402,080.

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RUDDER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALEXANDER McNAB, a subject of the King of Great Britain, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Rudders, of which the following is a specification.

This invention pertains to ships' rudders and has reference more particularly to that type wherein the impact and deflection of the water passing astern from the ship's propeller and in contact with the rudder, is utilized in maneuvering the ship. Various forms of rudders have heretofore been suggested and some of them have met with a greater or less degree of success.

The rudder forming the basis of the present invention is of that type wherein the wake or flow of the water passing from the propeller is employed to maneuver the vessel without the reversal of the direction of rotation of the propeller. In other words it is of that type where the stream or flow from the propeller is impounded and deflected in a forward direction so that such stream or streams tend to cause the vessel to go astern. In the types heretofore employed where the rudders are positioned to effect a backing of the vessel or ship with the propeller still running ahead, a somewhat perceptible slowing down in the speed of the vessel is noticeable over that which is effected by a reversal of the engine and propeller rotation.

The present invention has for its main object the production of a rudder of the so-called stream or wake deflecting type, wherein such reduction in speed astern is materially reduced. The construction, moreover, provides by reason of its form, a substantial clearance for the wake or stream from the propeller when the ship is going ahead.

The invention is illustrated in the annexed drawings, wherein,—

Fig. 1 is a rear view of the rudder, the propeller and a portion of the ship with the upper portion of the rudder and the operating mechanism therefor shown in section, the rudder in this instance being shown as open;

Fig. 2 a vertical sectional view of the rudder, the propeller and the stern of the ship being shown in elevation;

Fig. 3 a horizontal section taken on the line III—III of Fig. 1; and

Fig. 4 a similar view on a somewhat

smaller scale showing the sections of the rudder as brought together in a wake impounding and deflecting position such as will cause the ship to go astern.

In the drawings 1 denotes the stern frame of a ship or vessel, 2 the skeg or keel, and 3 the propeller. The rudder consists of two members of like form adapted to be swung to an open or a closed position and moved and swung laterally when open or closed to effect a steering of the vessel either forward or rearward. Each of said members is formed of sheet or plate metal and in cross section is V-shape in form, the upper and lower elements of said V being denoted by 4 and 5. Inasmuch as both elements are alike only one will be described and similar reference letters with the exponent "a" applied to the other.

Each of the rudder sections is beveled or inclined as at 6. The forward edge is preferably curved, as at 7. Said rudder elements are pivotally supported in rear of the propeller by any suitable means, as, for instance, a bolt 8 passing upwardly from the skeg or keel and through suitable castings 9 secured to the lower portion of the rudder members and at the upper end by a tubular rod 10 passing through a fixed bearing 11 and an inner rod 12 passing through the hollow rod 10. Said rods 10 and 12 are secured, respectively, to castings 13 and 13^a attached to the oppositely disposed rudder elements. Any suitable means may be employed for actuating said rods 10 and 12 so as to manipulate the rudder sections separately or conjointly according to the maneuver to be effected.

As will be seen upon reference to Fig. 1, in which position the rudder members are fully opened or separated, they have the outline of a rectangle with one pair of angles lying in the horizontal and the other in the vertical. It will also be seen, upon reference to the dotted line in said figure that a substantial clearance is provided between the path of rotation of the propeller and the corners or angular sections of the rudder elements, whereby impedance of the stream or flow passing from the propeller when the rudder is open is prevented.

When the rudder elements are swung to their closed position, or that shown in Fig. 4, the rearwardly inclined edges 6 and 6^a come together, the rudder sections then forming a box-like element closed at its rear

and open toward the propeller. The structure when in its closed position has the form of a hollow square pyramid, the outer rearwardly extending faces being inclined and terminating in an apex which offers but relatively slight resistance to rearward movement through the water. In going astern with the propeller running in its forward direction, it is necessary in order to effect quick speed in such rearward or astern movement, to maintain the wake or stream which is thrown rearwardly into the rudder and deflected outwardly in a lateral direction to each side of the stern of the vessel below the surface of the water as much as possible. The angular or V formation solves this difficulty to a considerable extent, but in order to break up the swirling motion of the wake and then prevent its rising to the surface, I preferably employ vanes or deflectors, one upon each of the rudder members. Said vanes are denoted by 14 and 14^a respectively, and are secured to the inner face or wall of the rudder elements, as best seen upon reference to Figs. 1 and 2. Said vanes incline downwardly from the forward toward the rear or outer end of the rudder elements and likewise are preferably widened toward their rear ends. When the rudder sections are brought to their closed position the ends 15 and 15^a abut or substantially abut (see Fig. 4). With the propeller rotating clockwise, as indicated by the arrows in Fig. 1, the vanes prevent rotative movement in the wake and cause the wake to travel in an outwardly direction along the angle or V of the rudder members, and thus the wake is kept below the surface of the water and its full effect in propelling the vessel astern is maintained.

It will be appreciated, of course, by those skilled in the art, that where the propeller is rotating counter-clockwise, as sometimes obtains, particularly where turbines are employed and the blades of the propeller are angled in the reverse of that shown in the drawing, the vanes 14 and 14^a would have to be secured to the opposite rudder faces from those shown, and inclined in the opposite direction.

By reason of the pyramidal form which the rudder elements produce when brought to their closed wake arresting position, as shown in Fig. 4, there is less resistance to the passage of the rudder rearwardly through the water. Moreover, by reason of the V or angular form of the rudder elements and the presence of the vanes adjacent such angles the wake, as above noted, is deflected or thrown forwardly in a plane more nearly horizontal than obtains with those types of rudders wherein the wake enveloping elements are rounded or semi-spherical.

The vanes not only assist in causing the water to stream in the proper direction when

the rudder is closed for the purpose of backing, but said vanes likewise break up the vortex of water in going either ahead or astern, and when going ahead the stream then applies its power longitudinally instead of in a spiral which would naturally be created to a greater or less extent if the vanes were not present.

What is claimed is,—

1. In combination with a ship and its propeller, a hollow wake arresting and deflecting body, said body having the form of a hollow pyramid with the open end thereof located adjacent the propeller and adapted to receive the wake passing therefrom and to deflect the same.

2. In combination with a ship and its propeller, a wake arresting and deflecting body, said body being hollow and having the form of a square pyramid with the vertex thereof located at a point remote from the propeller.

3. In combination with a ship and its propeller, a wake arresting and deflecting body, said body being hollow and having the form of a square pyramid with the vertex thereof located at a point remote from the propeller, said body being so positioned that two of its angles lie in a plane substantially coincident with the axis of the propeller.

4. In combination with a ship and its propeller, a wake arresting and deflecting body, said body being hollow and formed of two complementary members, said members being of such shape when brought together at their rear edges that they produce a pyramidal form; a pivotal support for said members located at the forward portion thereof; and means for moving each of said members about its pivotal support whereby said members may be brought into wake arresting position or spread apart so as to provide a clear passage for the wake passing from the propeller.

5. In combination with a ship and its propeller, a hollow wake arresting and deflecting body, said body being composed of two members, each member being substantially V shape in cross outline and provided at its rear with an inclined edge extending from the angle of the V toward the forward portion of the body whereby when said members are brought together with the said inclined edges in substantial contact they form a hollow pyramidal body with the vertex thereof located at a point remote from the propeller.

6. In combination with a ship and its propeller, a hollow wake arresting and deflecting body, said body being composed of two members, each member being substantially V shape in cross outline and provided at its rear with an inclined edge extending from the angle of the V toward the forward

portion of the body whereby when said members are brought together with the said inclined edges in substantial contact they form a hollow pyramidal body with the vertex thereof located at a point remote from the propeller; and a vane secured to the inner face of each of said members adjacent the angle thereof.

7. In combination with a ship and its propeller, a wake arresting and deflecting body; and means carried upon the inner face of said body adapted to arrest the swirling action of the wake passing from the propeller into the body and to deflect the same outwardly from the body in a substantially horizontal path.

8. In combination with a ship and its propeller, a wake arresting and deflecting body comprising two complementary members each substantially V shape in cross section with the rear edges thereof inclined so that when said members are brought to their closed position in rear of the propeller there is produced a hollow body pyramidal in form; and a vane located upon each of said members upon the inner face thereof and adjacent its angle, said vane inclining from the rear of the member toward the forward edge thereof.

In testimony whereof I have signed my name to this specification.

ALEXANDER McNAB.